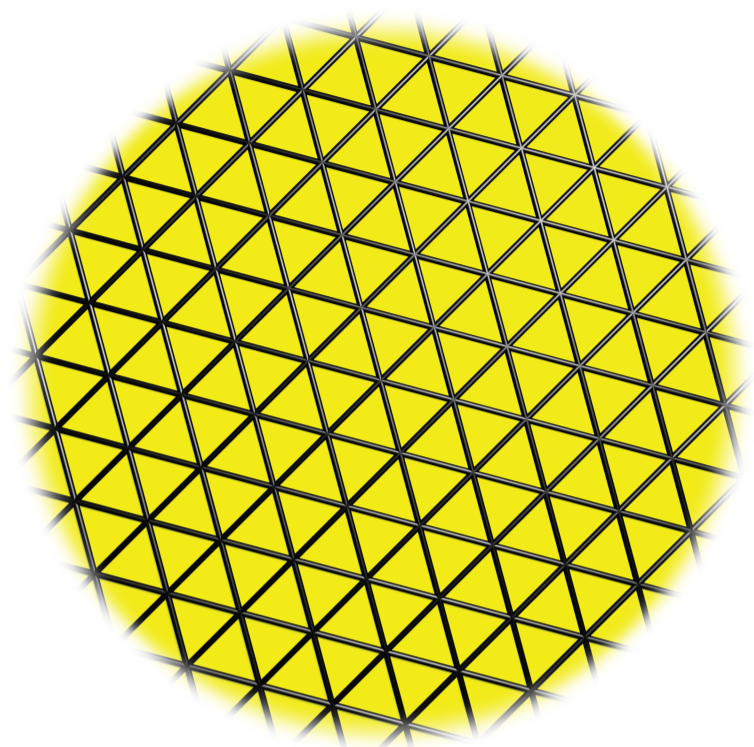




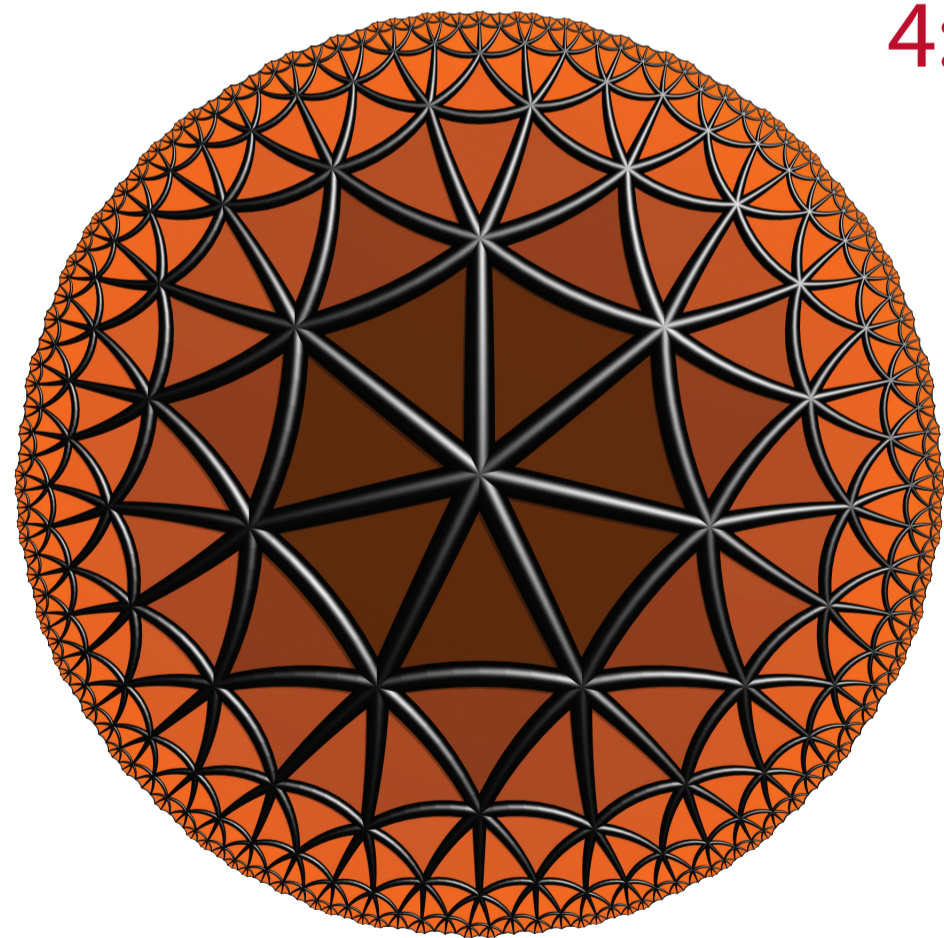
# How can triangles meet?

Six equilateral triangles lying flat round a point meet up. This can be extended to fill the plane:

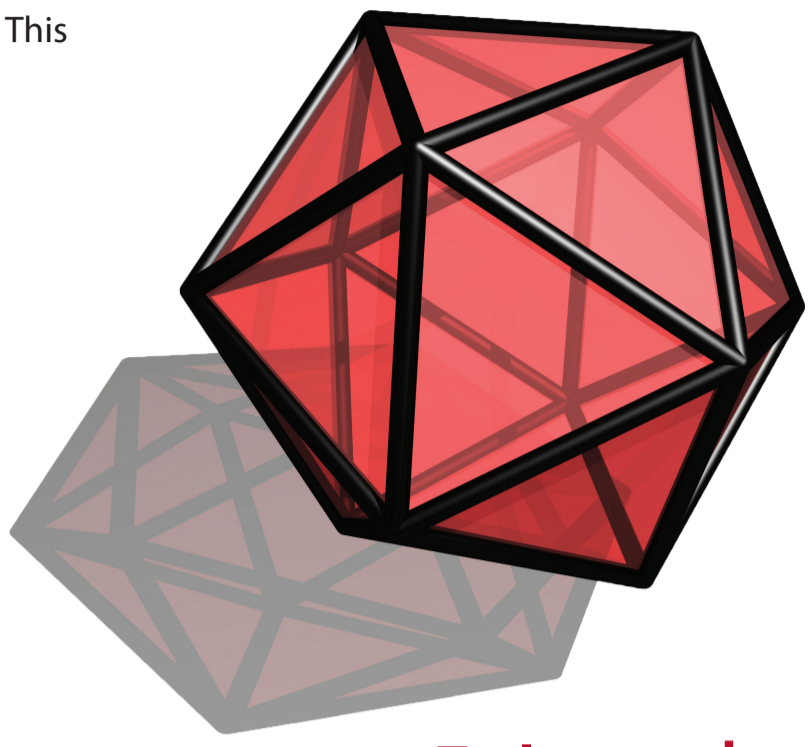


**6: Euclidean Tiling**  
infinite triangles  
6 round a vertex

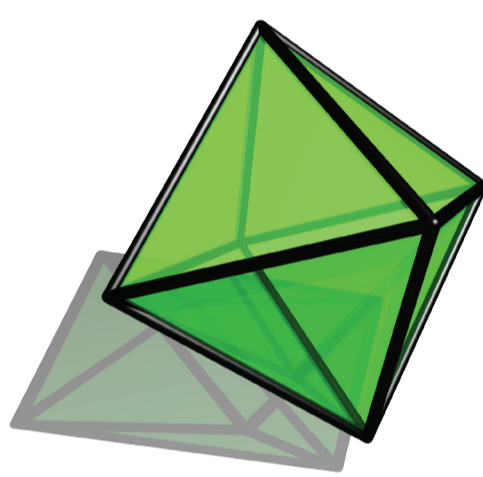
More than six equilateral triangles can meet up, but we have to fold in a different way. Can this be extended to a surface? Yes if you use mysterious hyperbolic space:



**7: Hyperbolic Tiling**  
infinite triangles  
7 round a vertex

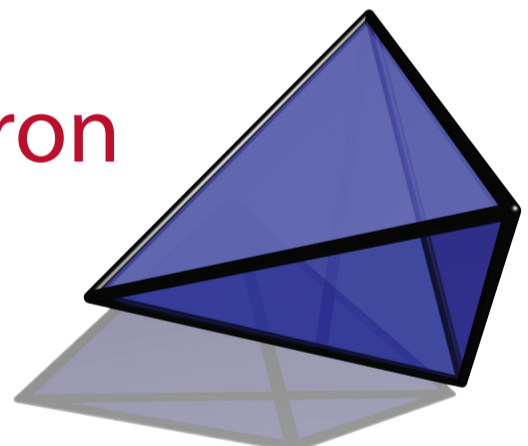


**5: Icosahedron**  
20 triangles  
5 round a vertex




**4: Octahedron**  
8 triangles  
4 round a vertex

Fewer than six triangles do not meet up if they lie flat. They can meet if we fold into a third dimension. Extending this gives three 3-dimensional shapes.



**3: Tetrahedron**  
4 triangles  
3 round a vertex

Can you see what happens when you put 3, 4 or 5 squares round a point? What about other polygons?

**Johannes Kepler 1571-1630** 

Johannes Kepler was a German mathematician and astronomer. He discovered laws of planetary motion that helped Newton to discover gravity. He was fascinated by polyhedra, even proposing them as a model for the Solar system. He made lists of tilings including the Archimedean tilings and a tantalising image not far from the Penrose Tiling.